was highly lauded as "Acclimatization" by half-informed persons calling themselves naturalists have been felt with fearful force. Nearly all the most interesting animals of New Zealand and Australia will disappear before the ravages of the *Mustelidæ*, so foolishly if not wickedly introduced to check the great but obviously transient pest of a superabundant population of Rabbits--themselves an inconsiderate importation. The Mongoose has been set free in Jamaica to kill the Rats that spoil the sugar-canes. Its effect on the Rats is inappreciable. It prefers another kind of country and a different food. The result is the destruction of every Turkey-Buzzard's egg it can find; the Turkey-Buzzard, commonly known as "John Crow"—a species cherished and protected by colonial law for its cathartic character—being a bird that makes its nest upon the ground, and ignorant of the danger it thereby incurs from the interloper. To the Mongoose is also laid the charge of extirpating the peculiar Petrel of the island, *Œstrelata jamaicensis*, which breeds in holes on the mountain sides, and proof of the crime seems likely enough after what Colonel Feilden has told us[1] of the extinction of its congener, *Œ. hæsitata*, the Diablotin in Dominica by a species of Opossum, imported with no evil intention, so far as is known, into that island.

It may surprise some persons who imagine that because Sea-fowls can and do roam almost illimitably they are, therefore, the safer from danger. The fate of the Diablotin is proof to the contrary. No birds possess the "homing" influence more strongly than Petrels, and of many species the home is a narrow one. The Diablotin has been known to wander to Long-Island Sound, the English Channel, the county of Norfolk, and even to Hungary, but its only home was in the Islands of Dominica and Guadeloupe, and in each it has apparently become extinct. In the early days of the colonization of the Bermudas, another species of Petrel, then and there known as the Cahow, which was presumably the *Puffinus auduboni*, was so abundant, upon at least some of the islands, that many of the settlers being at the time (between 1612 and 1615) suffering from famine and sickness, they were set ashore there by the Governor that they might feed on these birds. They did so, and nearly extirpated the species, so that a few years later (1616–1619) a succeeding Governor issued "a Proclamation against the spoile of Cahowes, but it came too late, for they were most destroyed before."[2] They never recovered their numbers, and when in 1849 Sir John Orde landed on the only island where the Cahow was reported still to exist, he found it represented by but two adults, a down-clad nestling, and an egg![3] Whether the species yet maintains itself there is unknown.

We have been led to make these remarks in consequence of the award, announced at the last general meeting of the Zoological Society, as already stated in our columns, of two of its silver medals to as many recipients, in recognition of the long-continued and successful efforts made by members of their respective families for more than one generation to protect from extermination one of the most remarkable species of our native birds. This species, the Great Skua, seems never to have had more than three breeding-stations in the British Islands, and all of them situated in Shetland where it is known familiarly as the "Bonxie." On one of these stations, Roeness Hill (commonly called Rona's Hill), in Mainland, it is said to have been exterminated some fifteen or twenty years ago. On each of the others it has been preserved—in the case of Foula, the most westerly of the group, and in that of Unst, the most northerly—by the exertions of the late Dr. Robert Scott and of the late Dr. Laurence Edmondston respectively. Though it has pleased some ornithological writers to give this bird the name of the "Common" Skua, the fact only shows how little they knew about it and its rarity. Widely ranging at other times of the year, in the breeding season it has but three resorts in the North Atlantic, and, though represented by other species in other parts of the globe, this is strictly a North Atlantic bird. The first of these resorts is in the Shetlands, as just stated; the second is in the Faeroes, where it was once fairly numerous, but latterly has been "minished and brought low"—since in 1872 a good observer computed the number upon all the islands in the group to be about thirty pairs; the third is in Iceland, where it seems to breed sporadically but not numerously along the southern shore, but is more abundant on the Westman Islands. Its existence, therefore, is exposed to much hazard, and if it is to survive in Shetland it will have to be protected. The protection afforded by the gentlemen above-named has saved it hitherto, and the recognition of their service to science thereby will be hailed, we are sure, by all as a graceful act on the part of the Zoological Society. True it is that the recognition is posthumous, and that the reward goes to the successors of the real benefactors, but the good effect of their example should not on that account be the less. Medals are struck and bestowed for preservation by posterity, and we trust that a long line of each of the families of Scott and Edmondston will look back with gratification on these memorials of good action on the part of their predecessors. We also congratulate the Zoological Society, the foremost of its kind in the world, on its discrimination as being the first to reward a service of this kind, and thereby to recognize the importance of attempting to ward off the dire effects of the process of extermination.

PSYCHOLOGY IN AMERICA.

Outlines of Physiological Psychology: A Text-book of Mental Science for Academies and Colleges. By George Trumbull Ladd, Professor of Philosophy in Yale University. (London: Longmans, 1891.)

The Principles of Psychology. By William James, Professor of Psychology in Harvard University. 2 Vols. (London: Macmillan, 1890.)

WHILE the "Outlines of Physiological Psychology" is not a mere abridgment of Prof. Ladd's larger work, entitled "Elements of Physiological Psychology," it is cast on the same general lines, and has a similar object in view. At the time of its appearance, we noticed at some length (NATURE, vol. xxxvi. p. 290) the longer and more elaborate treatise. This relieves us of any necessity for saying more than a few words of commendation and criticism of the later and shorter work. In it will be found a careful and accurate description of the results which have been reached through the experimental and physiological study of those neural processes which are regarded as the correlates of mental phenomena. What is known of the neural processes, and what is inferable concerning their psychical concomitants, are clearly and fairly presented; and concerning this part of Prof. Ladd's work we have naught to offer but praise of the impartial consideration of the facts and the judicial presentation of the results. But there are higher and more abstract regions of psychology, where exact correlation of mental processes with neural processes is at present impossible. From the point of view of physiological psychology these should either be left alone, or indicated as regions in which the nature of the correlation, if such exist, is at present unknown. Careful and judicious speculation in this region, if duly presented as such, is fairly admissible. But dogmatic assertions, positive or negative, are an occasion of stumbling to the student, and a serious dereliction of duty on the part of the teacher. When Prof. Ladd says that "a thorough analysis of mental life discloses other forms of activity than those properly called sensory-motor," he is well within his province; but when he proceeds to lay it down "that these forms not only do not find their full explanation in the changing state of the brain, but are not even conceivable as correlated with such states," he is building too confidently on his ignorance. It is noteworthy that, where our ignorance concerns a conclusion which he rejects, the conclusion is said to be "inconceivable"; but where it concerns a conclusion which he accepts (as in the case of the causal connection between the mind and the body as distinct entities), it is called a "mystery," and we are gravely admonished that "because of its mystery it is no less to be acknowledged as a fact." What is here spoken of as a "fact" is one solution out of several of one of the most difficult philosophical problems. Just where the scientific spirit, as opposed to that which is the outcome of other considerations, demands increased caution and modesty, since the grounds of perceptual verification are far distant, and since investigators of admitted knowledge, insight, and fairmindedness have reached other conclusions, Prof. Ladd assumes a dogmatic tone, which seems to us a serious error in an otherwise excellent work.

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[1] Transactions of the Norfolk and Norwich Naturalists' Society, vol. v. p. 24.

[2] See Lefroy's "Memorials of the Discovery and Early Settlement of the Bermudas or Somers Islands," vol. i. pp. 76, 137.

[3] Jones's "The Naturalist in Bermuda," p. 96.

In his "Principles of Psychology," Prof. James presents us with a work of unusual ability and power. His sturdy individuality, his keen insight, his wide range of learning and culture render him especially fitted for the task which he has undertaken. His pages abound in pithy epigrams, and observations which indicate that the author is a keen student of the individualities as well as the generalities of human thought and conduct. His style is at once lucid and flowing. Not a little of the matter which he has embodied in his pages has seen the light before in periodical publications; and this it is, perhaps, that has led to one of the defects we find in his work. It is too long. It many parts it would be rendered better and more effective by wise and judicious condensation. After reading a hundred and fifty pages on the perception of space, or a hundred and ten on the consciousness of self, one wishes that the author had seen fit to give us the essence of his thought in one-third of the space. Some of the longer quotations might go, or be considerably curtailed. In view of future editions, we would counsel Prof. James to make experiments on the following lines: to read ten pages over night, sleep over them, and condense them to five on the following morning. We believe his work will thus gain in power what it loses in bulk.

The method of arrangement of the subject-matter is somewhat peculiar and not altogether satisfactory. Perception, with which so much of our daily life is concerned, should have an earlier place; and the chapters on the stream of thought and the consciousness of self, with those on the automaton theory and the mind-stuff theory, might well have been deferred till towards the close of the treatise. This is, however, a matter of no great importance, since the work is presumably not intended for those who come fresh to the subject of psychology with no previous acquaintance with its methods and results; and every author of an advanced text-book has a perfect right to develop the subject as seemeth to him best.

It is obviously impossible in the space at our command to attempt anything like an analysis or detailed criticism of a work of well-nigh 1400 pages of closely-printed matter. Easy and pleasant would it be to dwell on the many arguments and passages which seem to us wholly satisfactory—which are, that is to say, in conformity with our own views. We think it better, however, to indicate some of the points in which we find Prof. James's treatment less satisfactory.

The description and definition of "perception" is on the whole excellent. It is clearly seen and enunciated that while part of what we perceive comes through the senses from the object before us, another part, and it may be the larger part, always comes, in Lazarus's phrase, out of our own head. The fact, also, that a pure sensation is an abstraction—that it answers to the presentative as isolated from the representative elements which the analysis of percepts discloses—is shown and insisted on. So far good. But the distinction thus satisfactorily laid down is not steadily adhered to. An hallucination is called "as good and true a *sensation* as if there were a real object." In the chapter on the perception of space we read in one place: "When we speak of the relation of direction of two points toward each other, we mean simply the *sensation* of the line that joins the two points together;" and again, "rightness and leftness, upness and downness, are pure *sensations*." But further on we find it stated that "for the distance between the 'here' and the 'there' to be felt, the entire intervening space must be itself an object of *perception*." Again, in the chapter on sensation we find it written: "And though our *sensations* cannot so analyze and talk of themselves, yet at their very first appearance, quite as much as at any later date, are they cognizant of all those qualities which we end by extracting and conceiving under the names 'objectivity,' 'exteriority,' and 'extent.'"

Now we venture to think that there is in all this a good deal of confusion, if not of thought at least of statement; though we must bear in mind Prof. James's view that "the words 'sensation' and 'perception' do not carry very definitely discriminated meanings in popular speech, and in Psychology also their meanings run into each other." A line, as such, is not an object of abstract sensation but of perception. Rightness and leftness are concepts; and the practical right and left or up and down which we observe in daily experience are the outcome of the perceptual process, are part of the perceived relations between sensations, and are not themselves sensations. This Prof. James himself practically admits when he tells us that "the fuller of relations an object is, the more it is something classed, *located*, measured, compared, assigned to a function, &c., the more unreservedly do we call the state of mind a perception." The title of the chapter on "The Perception of Space" is a misnomer. Space is a concept, not a percept: what we perceive is extension and distance, or rather that objects are extended and distant, out of which by abstraction thought reaches the conception of space. The same is true of time: what we perceive is duration, or rather that phenomena are enduring, and from this our thought rises to the conception of time. His confusion of terms makes Prof. James's discussion of space (in which he strives to establish an original *sensation of space*), and those parts of his chapter on sensation, in which he runs a tilt against the doctrine of "eccentric projection," rather difficult reading. With regard to the former question his contention, unless we misunderstand its essence, seems to come to this—that in our given perception of external things there are special relations of extent, direction, and distance, which are *sui generis*, and behind or beyond which we cannot get in the process of analysis. If this represent the core of his argument, we consider it sound; while, at the same time, we deny the sensation of space. With regard to "projection," again, the whole question seems to us to depend very much upon our definition of terms. Few will be likely to deny the fact that, in the immediate perception of adult life, the objects which we see are given to consciousness as external to us. We then proceed to analyze. And in our analysis we reach sensations, and the relations in which sensations lie to one another. The sensations are pure abstractions; they have been abstracted from their normal relationships; their outness is part of their relationship; therefore *quâ* sensations they have no outness. Moreover, analysis discloses, or seems to disclose, that consciousness, whether sensational or relational, is a concomitant of certain neural vibrations in the cerebral cortex. And the question arises, How does the consciousness accompanying these molecular processes in the brain give us the outness of the object of perception? The answer seems to us to be that certain of these neural processes are directly symbolic of this outness. The question thus shifts to one of origin: How have these neural processes come to be symbolic of outness? Prof. James himself tells us, in italics, that "every perception is an acquired perception." How, then, has the perception of outness been acquired? Whether we believe in use-inheritance, or, with Prof. James, rely on the selection of chance variations, the question is a valid and not an idle one.

Prof. James is insistent, as against the crude Associationalists, that a compounded idea is a new psychic fact to which the separate ideas stand in the relation, not of constituents, but of occasions of production. He denies, and in our opinion rightly denies, that we can explain the constitution of the higher mental states by viewing them as identical with the lower ones merely summed together. No more can we do so than we can explain the constitution of grey nerve-matter as identical with certain material atoms merely summed together. In each case the nature of the summation is determined by the fixed laws of the constitution of thoughts and things. Whether we have any right to say more than this, from the scientific standpoint, is open to question.

An interesting chapter is devoted to instinct. In Prof. James's acceptation of the term, instinct means innate impulse, or what we have elsewhere termed innate capacity for response in action, as opposed to any special and more or less definite manifestation of this impulse performed without intelligence and without practice. We question whether this wide extension of the field of instinct is advisable. In any case, it is in opposition to the tendency of recent thought on the subject.

In the last chapter there is an interesting and able discussion of the range and limits of experience. We propose merely to indicate the nature of the problem, and to refer our readers to Prof. James's work for his ingenious treatment of it. The modes of external noumenal existence are represented in the mind of man in mental symbolism. Whether the products of this mental symbolism in any sense *resemble* the noumena symbolized is wholly immaterial and altogether beside the question. To us it appears that the only phenomenal which can be colorably supposed to resemble the noumenal is that which we designate sequence. By Prof. James both time and space are so regarded. "The time- and space-relations between things," he says, "do stamp copies of themselves within." If we are right in understanding him to contend that our ideas of concrete things in any sense resemble their noumena, we altogether disagree with him But this, as we said, is immaterial.

Now, experience may be described as the adjustment of the symbolism for the practical purposes of life and thought. And in a series of organic beings this adjustment may be developed and perfected, either by the inheritance of individual increments of adjustment (use-inheritance), or by the elimination of failures in adjustment (natural selection), or by both combined. We may therefore speak of (1) experience as developed through use-inheritance, and (2) experience as developed by natural selection. Some people would have us restrict the term to the former category, which appears to us somewhat unsatisfactory. The more satisfactory plan is to distinguish between experience as a guide, determining what varieties spontaneously arising shall survive, and experience as a source of origin. If use-inheritance be disproved, experience as a source of origin goes by the board. But at the same time we may quite legitimately say that it is by experience that our mental symbolism has been *moulded*. For origin we are then thrown back either upon accidental variation (which is but a phrasal cloak for our ignorance), or upon the view that psychical development has obeyed certain fixed laws of our mental being, just as a crystal is developed in accordance with certain fixed laws of physical being.

When we have to deal, not with perceptual symbolism, where verification is within easy range, but with conceptual symbolism, the moulding by experience is indirect. Hence the divergent theories of things, ethical types, and æsthetic standards. Prof. James stoutly maintains that with these experience has had little or nothing to do. And he is so far right in that they rose to the clouds (or, if it sound better, the empyrean) of conception, from the solid (*i.e.* verifiable) ground of experience, and can only be tested in so far as their conclusions can be brought down to the same practical and mundane sphere. For the rest, as we have elsewhere suggested, our theories of things and interpretations of nature are subject to a process of elimination through incongruity, whereby conceptions incongruous with any individual system of mental symbolism strive in vain to enter therein and become incorporated therewith.

We have presented this question rather as it had formulated itself in our own mind before we had read Prof. James's work, than as it is set forth in his final chapter, to which we must now refer our readers. And we have dwelt upon the point at some length that our biological readers may see the bearing of the use-inheritance question in the mental field. Prof. James is on the side of Weismann, and rejects use-inheritance. Our own position is that of anti-dogmatism. We think use-inheritance is still upon its trial, and we desire to see fair play. Mr. Platt Ball's valuable discussion does not get down to the root of the question, which is really one of the origin of variations. We want more experimental evidence. But crucial experiments are hard to devise.

We regard Prof. James's work as an exceedingly valuable contribution to psychological literature; and trust that in a second edition he will make the index in some degree worthy of the volumes, the treasures of which it at present very inadequately indicates.

C. LLOYD MORGAN.

THE ANNUAL REPORT OF THE UNITED STATES GEOLOGICAL SURVEY.

Ninth Annual Report of the United States Geological Survey to the Secretary of the Interior, 1887–88. By J. W. Powell, Director. (Washington, 1889.)

A CONSIDERABLE part of this volume is occupied by the reports of the Director and of his principal assistants on the progress in work for the year 1887–88. Of these reports, several touch upon topics of general interest, but as they are more or less of a preliminary nature, we shall restrict ourselves to a notice, necessarily brief, of the larger and later part of the volume; that containing the papers accompanying the official report. The first of these, drawn up by Captain C. E. Dutton, gives a history of the Charleston earthquake on August 31, 1886, with a discussion of the observations collected in order to determine the position, depth, and velocity of the shock. The memoir begins with three accounts of the earthquake, contributed by eye-witnesses. The first is written in a graphic, perhaps over picturesque style, but as it was originally composed by one of the staff of a daily newspaper for public consumption, the roar of the young lion is to be expected; the others are shorter, simpler, but in some respects more valuable. At Charleston the first and principal shock occurred about 9.50 p.m. At that time the writer of the popular account was at work, as usual, in the office of the *Charleston News and Courier*, in a room on the second floor. His attention was first attracted by a sound, apparently from below, which was accompanied by a perceptible tremor, much as if a heavily-loaded dray were passing by. For two or three seconds the occurrence excited no surprise or comment:—

> "Then, by swift degrees, or all at once—it is difficult to say which—the sound deepened in volume, the tremor becoming more decided; the ear caught the rattle of window-sashes, gas-fixtures, and other movable objects.... The long roll deepened and spread into an awful roar that seemed to pervade at once the troubled earth and the still air above and around. The tremor was now a rude, rapid quiver that agitated the whole lofty strong-walled building, as though it were being shaken—shaken by the hand of an immeasurable power; . . . there was no intermission in the vibration of the mighty subterranean engine. From the first to the last it was a continuous jar, adding force with every moment, and as it approached and reached the climax of its manifestation, it seemed for a few seconds that no work of human hands could possibly survive the shocks. . . . For a second or two it seemed that the worst had passed, and that the violent motion was subsiding. It increased again, and became as severe as before. . . . The uproar slowly died away in seeming distance. The earth was still."

The earthquake also was very severe at Summerville, a village 22 miles to the north-west, where some slight preliminary shocks had been felt on August 27 and 28, which, however, were not perceived at Charleston. Other shocks occurred at Charleston during the month following, but fortunately none were severe. But the devastation caused by the great shock was lamentable: 27 persons were killed; at least thrice that number died afterwards from hurts, or the indirect results of the earthquake; not more than half-a-dozen houses escaped injury; many buildings were practically destroyed. The numerous illustrations, taken in many cases from photographs, enable the reader to judge of the devastation. "Hibernian Hall," with two broken columns, projecting from a mass of *débris*, the sole remnants of a portico, might, at the present day, suggest to some minds a political interpretation. The work of the jerry-builder—who evidently exists in Charleston as in London—was revealed by the earthquake, which proved to be a satisfactory, though expensive test of the relative value of different building materials. Fissures and craterlets were formed in the surrounding country, from which water and sand were ejected. The tracks of railways were distorted and otherwise injured; and in one case a train was wrecked by being thrown off the rails.

Captain Dutton's observations have enabled him to construct a map of the isoseismal lines, and to estimate the depth and velocity of the shock. These "isoseisms" are arranged about two "epicentra," which lie on a straight line running rather west of south, about 13 miles apart, and nearly as much west of Charleston. The curves around the northern one are almost circular; around the southern one they are somewhat elongated and rather distorted ovals. To the focus of the former a depth of 12 miles is assigned, with a probable error of less than 2 miles; to that of the latter, a depth of nearly